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THE VALUE OF PAIN.

PAIN is one of the essential conditions of progress. Not merely in the sense of being part of the friction which necessarily accompanies all movement, but as a vital precedent of all possibility of movement. Ask any biologist what is the first and most important property of living matter and he will tell you that it is "irritability," the power of responding to stimuli or impressions. Touch with a needle point the most beautiful and brilliant crystal and you get absolutely no response, turn to the grayest and flabbiest bit of ditch-water animal-jelly that you can find and he moves himself away from the steel at once.

He can feel, therefore he lives. And if he feels at all he must be able to feel pain as well as pleasure. Nay it is even more important that he should perceive the disagreeable stimulus than the agreeable, for the former needs to be moved away from while the latter does not. Leave him capable of only pleasurable sensations and he will be destroyed inside of an hour.

In this earliest form the powers of sensation and of responding to impressions are combined in the same cell, but as the organism becomes more complex, more extensive and powerful movements are called for, and special cells are set aside for contractile purposes alone, leaving to the surface cells the duty of sensation only. Later it becomes not merely a question of escape but also of retaliation, and a central office to combine the muscle-strands in orderly military movements is needed and the ganglion-brain is called into being. In the meantime the surface cells have been dividing up the work of feeling among themselves, some have educated themselves to catch the finest variations in the light-rays

some confine their entire study to the sound-waves, others to the changes of temperature, while the vast majority of them simply refine upon their original powers of contact-perception or touch. Thus out of the simple possibility of discomfort arise the five senses, their muscle-standing-army and their joint judicio-executive brain. Pain is the mother of the mind, and muscle is its father.

Nor can this powerful factor in the creation of the body-organism be permitted to "rest upon the seventh day," like the Jahveh of Genesis, when its work is apparently completed. The possibility of the continuance of life absolutely depends upon its incessant activity. Cut the nerve which connects any part or organ with the conscious brain and you place it in serious peril at once. Precisely as if you blindfolded a man and then turned him loose in an enemy's country, or as if you cut the wire which connected an outlying military post with headquarters. You may cut the motor nerve which conveys orders from the brain, or, what is equivalent, destroy the "motor centre" of the part in the brain with comparative impunity, as far as the nutrition of the limb is concerned; it loses the power of motion, but even the muscles retain their bulk for a long time in spite of lack of exercise and the general health if the member remains perfect.

But it is far otherwise when sensation is destroyed. The benumbed hand or foot goes stumbling along like a blind man, cutting itself here, burning itself there, rasping its surface against a hundred objects, and from every merest scratch an ulcer forms. So long as all its cells are in health and vigor and can live on the standard rations of the rest of the body, issued to them through the blood-vessels, all goes well, but the moment any of them fall below par from injury or otherwise and cannot notify the central commissariat of the fact, they fall into the plight of a baby trying to live on government rations of hard-tack and salt-beef. That heat and swelling about a wound which we term "inflammation" is merely a forced and special feeding-up of the neighboring cells to enable them to breed rapidly and fill the gap, and while in excess it is a source of danger in itself, in its absence there can be no healing.

Observe it is not the loss of the power to pass the signal "All's well" that is injurious, it is the inability to report discomfort. Not the absence of all sensation, but the absence of painful ones that is fatal.

For instance, in paralysis of the aged, one of the chief dangers to life is from the formation of ulcers about the back and hips due solely to pressure against the mattress and hence known as "bed-sores." The peculiar danger of these is first that, sensation being abolished, they will form without the patient's knowledge, and in neglected cases will often attain the size of the palm of the hand and a depth of an inch or more before they are discovered, and second, that communication with the brain being cut off, little or no inflammation occurs and they are extremely difficult to heal. It is no uncommon thing to see them six inches in diameter and an inch deep and yet with scarcely enough inflammatory reaction around them to redden the skin at their edges. This absence of pain and consequent inflammation not only impairs healing-power but also deprives the general system of one of its chief barriers against the absorption of the products of decay, and a fatal blood-poisoning is extremely apt to occur.

A peculiar illustration of the uses of pain is afforded by that dread disease leprosy. Here one of the earliest symptoms is the loss of sensation in a hand and arm or foot while the muscular power is unaffected. Many a victim has first discovered his condition by severely burning or cutting himself without feeling pain. In one dramatically tragic case, a planter who supposed himself in perfect health thoughtlessly caught a heated lamp-chimney which was falling, and didn't know it was burning him until the smell of his scorching fingers attracted his attention! What is the result? In a very short time tiny cracks, bruises, and scratches develop all over the hand or limb affected, these rapidly grow into ulcers and either heal very slowly or steadily deepen until fingers, toes, nay even hands and feet are completely amputated by them, or the limb is so drawn and crippled by the great scars that it becomes almost useless. There are of course active processes of destruction at work as well in the disease, but the greater part of the terrible

deformities of the limbs produced by leprosy are due solely to this negative destruction of sensation and its consequences. In modern hospitals it is found that by keeping lepers in bed, in comfortable wards and protecting their extremities against injury and irritation in every possible way, their lives may be very greatly, if not almost indefinitely, prolonged.

But there is also another way in which pain is of marked benefit in case of disease or injury, and that is by securing rest for the part affected. The agony of an inflamed joint, for instance, is an imperative order to the muscles controlling its movements to keep it perfectly still and motionless. And the order is usually strictly obeyed. So important does nature consider it that, by a curious transference, the pain of a diseased hip-joint, for instance, will be felt by the sufferer in the knee and ankle, so as to keep the whole limb at rest. This function of pain is beautifully illustrated in the lower animals. A broken leg in a dog or a deer, for instance, will be so carefully protected against the pain of movement, supported against the other limb, rested against the side of the body and swung along with such a gentle movement, with its toe just trailing on the ground, that the results are often equal to the best that we can boast with all our splints and bandages. Truly, pain is nature's splint.

A similar protective influence is exerted over the inflamed lung by the acute distress of pleurisy.

"But," says some one, "what of those diseases in which pain is the principal evil, in which no structural changes can be found in any way proportionate to the agony endured, what of neuralgia, of blinding 'sick-headache,' of sciatica? Is not the pain the disease in these cases?" By no means. It cannot be too emphatically asserted that pain always *means something*. It does not occur simply as an accident of chance, still less for the purpose of developing patience, or as a "means of grace," but as a pointed reminder that something is going wrong. Neuralgia is the cry of the nerves for more sunlight, "sick-headache" a protest against eye-strain. In themselves comparatively harmless, as danger-signals they are simply invaluable. Hence the seeming paradox, that those who

suffer most, often live the longest: the sensitiveness of their nerves absolutely compels them to halt at the very threshold of danger.

Pain is literally the price of life. And this brings us to the question: "What is pain?" abstractly considered. "What is the difference and what the relation between it and pleasure?" We are all perfectly clear in our own minds on these questions, in the concrete, from personal experience, but how shall we define our conception? On careful ultimate analysis we are driven to the somewhat unexpected conclusion that pain and pleasure are really both vibrations of one and the same chord. That the very sensitiveness which makes the one possible, necessarily makes the other also possible. That the only way to prevent painful impressions, from our environment, is to destroy the mechanism which permits the reception of pleasurable ones. In short, life without pain would necessarily be life without pleasure. The old mythic poets made a shrewd guess at this scientific truth when they described the life on Olympus as "colorless," "joyless," and sang of the "twilight of the gods." And Kipling's prophetic insight has caught the same ray, in his magnificent parable, the greatest poetic conception of the century, "The Children of the Zodiac."

More than this, the two sensations are not merely vibrations of the same chord, but varying degrees of the *same vibrations*. The difference between them is one not of kind but of degree. Almost any pleasurable sensation can be transformed into a painful one by simply increasing its intensity, and many painful ones into pleasurable merely by decreasing their intensity or changing the circumstances.

The instantaneous coolness of a piece of ice placed upon a parched tongue is delicious, but let contact be prolonged only a few seconds and the very same "coolness" becomes intense discomfort. The similar "transformation" of the warmth of a Yule log is another illustration which of course suggests itself. A flood of golden sunlight is the most pleasing sight which falls upon our retina, but throw the rays directly into the eye and a dazzling pain takes the place of the former enjoyment. A gentle friction of the body-surface is an agreeable sensation to nearly every one, but in-

crease the pressure or rapidity a little and it produces a burning pain. The sensation of "sweetness" is so keenly enjoyable that it has become in connexion with "light" a critical synonym for the highest good, and in childhood an abundance of "sweeties" or "candy" is temporary Paradise, yet how many adults are there in whom a very few spoonfuls of simple sugar will not promptly convert this delight into loathing, and how few to whom the "over-sweet" taste of glycerine, chloroform, or saccharine is not positively repulsive?

In short, pain is *any* sensation raised above a certain intensity. And even the degree of this intensity varies widely with the individual and the circumstances.

On the other hand, it is well-nigh impossible to draw a line of demarcation between, for instance, the pangs of hunger and the pleasant cravings of appetite, between an intolerable itching and a pleasant tickling sensation, between the joy of longing and the bitterness of "hope deferred."

"But," asks some one, "even granting that pain is necessary, is it not merely a necessary evil, and are not its general effects purely disastrous?" Quite the contrary, the effects of pain in improving and developing both the individual and the social organism have been just as powerfully beneficent as in creating them.

It is, of course, obvious that pain or the dread of it has been the chief factor in the development of the means of escape from it, and of the myriad mechanisms in beast, in bird, and fish that subserve this end. It is no mere coincidence that the most timid creatures are also the fleetest, the trout, the deer, the hare, the swallow, for instance, while their fleetness again is the only thing that enables them to afford such rare beauty of form and coloring. The fin of the fish, the wing of the bird, the legs of the deer, owe their development in large measure to hunger and fear.

There is also a pretty direct connexion between the sensitiveness of animals and the degree of their intelligence. The indifference of the turtle to pain is largely concerned with his limited cerebral capacity, the thickness of the pig's hide is a good index of his

mental power, and the stupidity of the sloth is closely connected with the dullness of all his perceptions.

But it is when we come to consider the potency of pain in social development that its value stands out most clearly. The earliest political unit is a group formed for mutual protection against hunger, cold, and wild beasts. Danger compels men to herd together, and all the social virtues are fostered by it.

The rowels of nature's most powerful spur, hunger, are continually reddening the flanks of the primitive community. The Apostle's scathing arraignment of the Cretans, "whose god is their belly," would literally apply to every savage tribe—and many a civilised one. Hunger is one of the mainsprings of progress. At its imperative command the flint was chipped into the arrow-head, the dart, the spear. In its honor the net was woven, the hoe was made, and the soil broken. To appease its cravings the wild-bull is broken to the yoke, the forests are felled, the ditch is dug through the marsh.

On its errands the ship is launched on the perilous deep and the band sent out upon the war-path. Into its service have been impressed the winds of heaven, the steam-wreaths of the cauldron, and the glittering shafts of the lightning. It is the real Aladdin's lamp of civilisation. The ceaseless westward flow of the human stream and march of the "star of empire" has been at the behest of its Genii. Whether it be born of a barren soil and a cruel sky or of the pressure of over-population, it has played a leading part in moulding the destinies of the nations.

In the fall of every world-empire from Assyria to Rome the conquering race has invariably come from a mountainous or barren land, or from a sterner sky.

And still to-day the nations of the bleakest belt of the temperate zone, where the struggle with soil and climate is severest, the Scotch, the English, the Dutch, and the North-Germans are over-running the whole of the inhabitable globe and bid fair to far outdo Alexander by more peaceable and far more stable means.

To what is the Scotchman more deeply indebted for his world-renowned, "long-headedness," enterprise, and frugality than to his

stony soil, his barren muir-lands and his "dour" climate, to say nothing of the kilted Highlander on one side of him and the English guager on the other? Have the dogged perseverance, the quenchless love of liberty, and the sturdy honesty of the Dutchman which have written him such a brilliant record on the pages of modern history no connexion with his ceaseless struggle to beat back the cruel tooth of gray old ocean from his hearth-stone? An old historian has quaintly suggested one reason for the extraordinary exploring-enterprise of those matchless old sea-falcons, our Viking ancestors, in the statement that they were "certaine of lighting upon no moe cheerlesse place, than that whence they sette forth."

Indeed it is almost an axiom of anthropology that the white race cannot flourish where the snow never lies. Below a certain degree of latitude it invariably degenerates. The stinging kiss of the Frost-king is absolutely necessary to the perfect development of the blood-red flower of Aryan civilisation.

In fine, hunger, cold, and poverty are veritable blessings in disguise, and even to-day prompt a large proportion of our productive activities. There is the soundest physical basis for the spiritual beatitude, "Blessed are the poor."

Are the benefits of pain limited to the purely physical, the commercial, and the military aspects of man's development? Far from it, for in the intellectual and moral realms its laurels are brighter yet. I venture to claim it as the very father of science. The earliest dawn of knowledge in the mind of our primitive ancestors was a recognition of the healthfulness or harmfulness of all objects as articles of diet. A knowledge gained by bitter experience. To this day a baby's first and chief criterion of everything about him is his mouth. Into that rosy opening is thrust impartially, just as far as it will go, everything that his chubby paws can clutch from the contents of the coal-bucket to the painted monkey on a stick. And his earliest mental concept divides the universe simply into two divisions, that which tastes nice and that which does not.

Some of you may have seen a picture by the idealist Watts

which represents our first parents seated side by side upon a sunny sea-beach. A number of empty clam, oyster, whelk, and other gaudily colored sea-shells are strewn about them, the evident remains of a primitive "clam-bake" in which the couple have just been indulging. There is a pained and regretful expression upon the countenance of the man, and he presses his hand over his distended stomach in a most expressive fashion, while his wife watches him in surprise and uneasiness. Some of the shell-fish have evidently been out of season or of a poisonous variety. The title of the picture is brief but expressive: "The Birth of Experience." And after some such fashion unquestionably did human experience and human wisdom begin. And more progress was due to the bitter episodes than the sweet, for the impression made by them was incomparably deeper. The school of experience is proverbially a "hard" one, and "sadder but wiser" has become a household word. Literally "the fear of the Lord is the beginning of wisdom." Just as most of the implements of peaceful industry were originally weapons of war, so many of our most valuable scientific discoveries and inventions have their origin in the bitter stress and makeshift of acute discomfort. For instance our entire knowledge of the structure and workings in health of this wonderful body of ours had its birth in the study of its condition in disease. Pathology is the mother of both physiology and anatomy. By a singular oversight several of our organs are still described in our text-books to-day not as they appear in health or during life but as they appear after death or in positively diseased conditions. For so many centuries our attention had been called to them only when diseased or upon the post-mortem table that we had unconsciously come to regard these as their normal appearances. The first and only thing that induced primitive man to concern himself with his interior arrangements was their causing him discomfort. This discomfort whether apparently primary as pain or fever, or secondary as hunger or frost-bite, was promptly set down as due to the activities of more or less numerous evil spirits. To cure these evils it is necessary to appease the spirits; sacrifices are made, and a ritual is born. Thus the earliest gods of the race are deified discomforts. And the Je-

hovah of Decalogue, the "angry god" of the Puritan still bears sad but distinct traces of his origin. A distinct class quickly springs up whose sole function it is to propitiate or even at times repel these troublesome influences. This caste, formed for the simple but comprehensive purpose of relieving discomfort or averting disaster, both individual and tribal, is primarily medical in the broadest sense of the term. Not only is personal healing required of it, but also state medicine, sanitary science in the widest sense. But as most of the disturbances he is confronted with are attributed to spiritual agencies, his work rapidly takes on a priestly character as well. The shaman, conjurer, rain-doctor, or voodoo is neither priest nor physician—but the common ancestor of both, as his Indian name of "medicine man" indicates to this day. And from this singular and oft times grotesque individual spring not only two out of our three "learned professions," but also, incredible as it may seem, most of our scientists as well. Thus part of the bitterness of the warfare between theologians and scientists may be accounted for on the ground that it is a family feud. To aid him in the individual part of his duties, the relief of aches, of fevers, of dysenteries, our physician-priest presses into his service the herbs, the roots, the berries of the surrounding copses, or the mineral earths of the cliffs, and from these crude beginnings botany and chemistry with their descendants biology and geology are born. To this day a number of our common plants still bear the names given them from their supposed medicinal virtues: such as "bone-set," "liverwort," "sorrel" ("sore heal") "feverfew," etc. For assistance in the tribal part of his functions, the prevention of drought, the securing of plentiful crops, and assuring against defeat in battle, he naturally appeals to the only heavenly bodies visible to him, and astronomy with its daughters, physics and navigation is brought into being.

Many if not most of our best known stars and planets still bear as scientific titles the names given them when prayed to for aid, or used in the construction of horoscopes.

Even as the greedy quest of the philosopher's stone led to many an invaluable chemical discovery far more "golden" to the

race than the discovery of its object would have been, or as the wild and eager search after the fountain of youth developed continent after continent of undreamed-of richness and beauty, so the desperate shifts and vigorous efforts to escape the sharp spear of pain have won for the race a knowledge, a power, and a happiness beyond their wildest dreams.

As to the uses and value of pain in the moral realm, these have been so fully and constantly insisted upon by prophets of every creed that nothing more than the merest allusion is needed here. Indeed its importance has, if anything, been exaggerated, but even upon the soberest view of the subject it must be rated very high.

For instance it is obvious that without pain or the possibility of it there could be no true courage, no patience, no self-denial or devotion, without hardship, no endurance or fortitude, without tribulation, no faith.

It is not too much to say that without suffering no true character or virtue could be developed any more than muscle and vigor without hunger and cold; that the choicest of the saints are and ever have been "they that have come up out of great tribulation."

Pain is by no means the only or even the chief influence in moulding the destiny of man, indeed as our next contention will be, its antithesis, joy, is equally necessary and even more potent, but it is the keen and biting chisel under whose edge alone can the figure of the perfect man be hewn out of the lifeless marble.

WOODS HUTCHINSON, M. D.

UNIVERSITY OF BUFFALO.